Appl. No. 10/604,244
Amdt. dated March 28, 2005
Reply to Office action of December 28, 2004

Amendments to the Claims:

Listing of Claims:

Claim 1 (currently amended): A method for analyzing in-line quality

5 control (QC) test parameters, the method being used to analyze a plurality

of lots of products, each lot of products comprising a lot number, the

products being formed using a plurality of equipments, at least one wafer

of each lot of products being tested by at least one in-line QC test item to

generate an in-line QC test parameter, the in-line QC test item, and its

10 related sample test item and wafer test item being stored in a database, the

database further storing the in-line QC test parameter and data of a

plurality of lots of high-yield product stocks, such as test items and test

parameters, the method comprising:

analyzing the in-line QC test parameter of the wafer to determine

15 whether the in-line QC test parameter corresponds to a predetermined spec

or not;

searching the database to find out the sample test item or the wafer

test item related to the in-line QC test item when the in-line QC test

parameter of the wafer does not correspond to the predetermined spec;

20 searching the database to find out the corresponding test parameters in

the sample test item or the wafer test item of the high-yield product stocks

according to the in-line QC test item and the searched sample test item or

the wafer test item; and

using the in-line QC test parameter of the wafer and the searched test

25 parameters in the sample test item of the high-yield product stocks to

generate generating a correlation to illustrate the relationship between the

in-line QC test item and the sample test item and using the in-line QC test

2

parameter of the wafer and the correlation to predict a test parameter for the wafer in the sample test item, or using the in-line QC test parameter of the wafer and the searched test parameters in the wafer test item of the high-yield product stocks to generate a correction to illustrate the

5   relationship between the in-line QC test item and the wafer test item and using the in-line QC test parameter of the wafer and the correlation to predict a test parameter for the wafer in the wafer test item according to the searched high-yield product stocks.

10   Claim 2 (currently amended): The method of claim 1 wherein the lots of products are not yet tested by [[a]] the sample test process item and [[a]] the wafer test process item but obtain the predicted test parameter for each wafer of the lots of products in the sample test item or the wafer test item using the in-line QC test parameter of the wafer and the correlation

15   between the in-line QC test item and the sample test item or the wafer test item.

Claim 3 (original): The method of claim 1 wherein the correlation between the in-line QC test item and the sample test item, and the correlation

20   between the in-line QC test item and the wafer test item are generated using linear regression methods.

Claim 4 (canceled)

25   Claim 5 (canceled)

Claim 6 (original): The method of claim 1 wherein the database stores data of a process step related to the in-line QC test item, and the method

3

Appl. No. 10/604,244
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further comprises:

classifying the lots of products into two groups according to a first spec, the two groups of products comprising a qualified group of products corresponding to the first spec, and a failed group of products not
5   corresponding to the first spec;

searching the database to find out the process step related to the in-line QC test item;

finding the equipments used in the process step according to the lot numbers of the two groups of products; and
10   determining the equipment through which a probability that the failed group of products have passed is higher than a probability that the qualified group of products have passed.

Claim 7 (original): The method of claim 6 wherein commonality analysis
15   is used to determine the equipment through which a probability that a low-yield group of products have passed is higher than a probability that a high-yield group of products have passed.

Claim 8 (original): The method of claim 1 further comprising:
20   searching test results of each of the sample test items and each of the in-line QC test items of the lots of products after a sample test process of the lots of products; and

generating a correlation between each of the sample test items and each of the in-line QC test items according to the searching results.
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Claim 9 (original): The method of claim 8 wherein the correlation between each of the sample test items and each of the in-line QC test items is generated by a multiple regression model.

4

Claim 10 (original): The method of claim 8 wherein the correlation between each of the sample test items and each of the in-line QC test items is generated by a stepwise regression model.

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Claim 11 (original): The method of claim 8 wherein the correlation between each of the sample test items and each of the in-line QC test items is illustrated by a residual plot.

10   Claim 12 (currently amended): The method of claim 1 further comprising:
        searching test ~~results~~ parameters of each of the sample test items and each of the in-line QC test items of the lots of products ~~after a sample test process of~~ when the lots of products are tested by the sample test item;
        classifying the lots of products into a plurality of groups according to
15   the parameters of each of the in-line QC test items of the lots of products;
        analyzing the sample test parameters of each group of products; and
        analyzing and obtaining the group of products having the sample test parameters most similar to a second spec when the sample test parameters of the groups of products are different.

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Claim 13 (original): The method of claim 12 wherein an ANOVA method is used to analyze whether the sample test parameters of the groups of products are different or not.

25   Claim 14 (original): The method of claim 12 wherein a Duncan's multiple range test is used to analyze and obtain the group of products having the sample test parameters most similar to the predetermined spec.

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Claim 15 (original): The method of claim 12 wherein the classified lots of products are illustrated by a box plot.

Claim 16 (original): The method of claim 12 wherein each of the in-line
5   QC test parameters of the obtained group of products is used as a predetermined spec of the subsequent products.

Claim 17 (new): A method for analyzing in-line quality control test parameters, the method being used to analyze a plurality of lots of
10 products, each lot of products comprising a lot number, the products being formed using a plurality of equipments, at least one wafer of each lot of products being tested by at least one in-line QC test item to generate an in-line QC test parameter, the in-line QC test item, and its related sample test item and wafer test item being stored in a database, the database
15 further storing the in-line QC test parameter, data of a process step related to the in-line QC test item, and data of a plurality of lots of high-yield product stocks, such as test items and test parameters, the method comprising:
        classifying the lots of products being tested by the in-line QC test
20 item into two groups according to a first spec, the two groups of products comprising a qualified group of products which has the in-line QC test parameters corresponding to the first spec, and a failed group of products which has the in-line QC test parameters not corresponding to the first spec;
25   searching the database to find out the process step related to the in-line QC test item;
        finding the equipments used in the process step according to the lot numbers of the two groups of products;

6

determining the equipment through which a probability that the failed group of products have passed is higher than a probability that the qualified group of products have passed, the equipment having the higher probability that the failed group of products have passed through being the

5   possibly faulty equipment;

searching the database to find out the sample test item or the wafer test item related to the in-line QC test item;

searching the database to find out the corresponding test parameters in the sample test item or the wafer test item of the high-yield product stocks

10   according to the in-line QC test item and the searched sample test item or the wafer test item; and

using the in-line QC test parameters of the failed group of products and the searched test parameters in the sample test item or the wafer test item of the high-yield product stocks to generate a correlation to illustrate

15   the relationship between the in-line QC test item and the sample test item, or the relationship between the in-line QC test item and the wafer test item.

Claim 18 (new): The method of claim 17 wherein the lots of products are

20   not yet tested by the sample test item and the wafer test item and the correlation between the in-line QC test item and the sample test item or the wafer test item is utilized to predict test parameter for each wafer of the lots of products in the sample test item or the wafer test item.

25   Claim 19 (new): The method of claim 17 wherein the correlation between the in-line QC test item and the sample test item, and the correlation between the in-line QC test item and the wafer test item are generated using linear regression methods.

7

Appl. No. 10/604,244
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Claim 20 (new): The method of claim 17 wherein commonality analysis is used to determine the equipment through which a probability that a low-yield group of products have passed is higher than a probability that a
5   high-yield group of products have passed.

8